July 8, 1985

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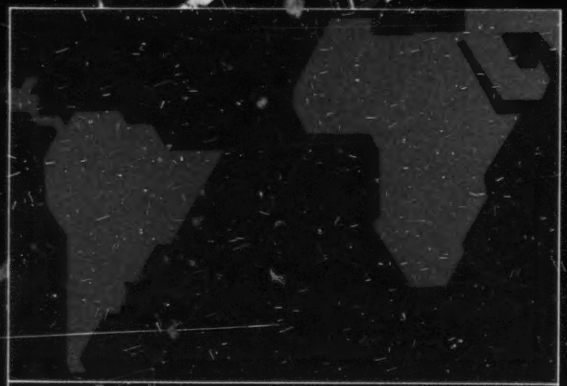


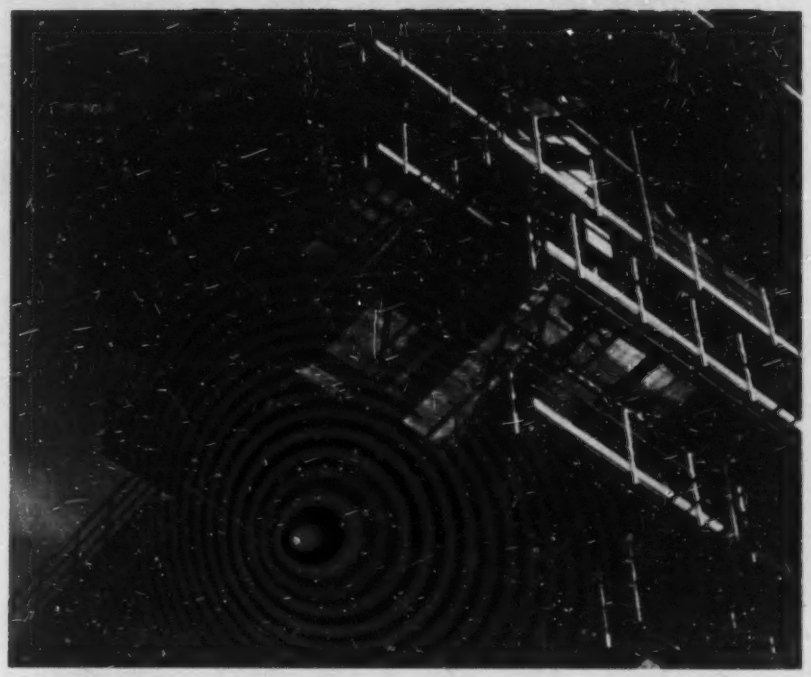
STEEL IN THE THIRD WORLD

THE DRIVE TOWARD CONTINUOUS COLD STEELMAKING

QUANEX'S 'SEAM FREE' BAR PLANT IN ARKANSAS

JULY 5, 1985 VOL. 228, NO. 13

IRON AGE METALS PRODUCER



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Developing Countries: Total Debt and Debt Servicing Costs

Billions of U.S. Dollars	1980	1981	1982	1983	1984	1985
Total Debt	610	702	775	843	895	970
Servicing Costs	90	109	124	112	121	143
As a Pct of Total Exports	17	20	24	22	22	23

Source: Intl. Iron and Steel Institute

Western World Liquid Steelmaking Capacity

Million Metric Tons	1974	1980	1990
W. Europe	203	223	181/191
N. America	156	152	136/142
Japan	126	142	130/135
Dev. Countries*	33	60	104/116
Others	15	18	20/26
TOTAL	533	595	571/610

Source: Intl. Iron and Steel Institute
*NOW 70

Western World Apparent Steel Consumption Developing Countries, 1985/84

Million Metric Tons	1984 Actual	1985 Forecast	Pct Change 1985/84
Latin America	28	29	+4
Middle East	18	18	—
Africa (excl. S. Africa)	12	12	—
Asia (excl. Japan)	48	51	+6
TOTAL	106	110	+4

Source: Intl. Iron and Steel Institute

The big SIDOR complex in Venezuela has had problems. There were also problems initially at the FIOR direct reduction plant located in the same region of Venezuela.

STEEL IN THE THIRD WORLD

By 1990, it's expected the developing countries will have as much as 116 million tons of raw steel capability.

BY GEORGE MCMANUS

In 1984, the United States imported steel from 59 different countries.

These included Hong Kong, Bangladesh, Iran, and China. Developing countries like these supplied 10 million tons or 34 pct of the record U.S. imports in 1984.

That tonnage just about equalled the total raw steel capacity of Third World countries in 1960. With steelmaking largely confined to the industrial centers in those days, you weren't able to solve steel problems but you could at least come to grips with the problems.

Today, steel is being produced in nearly 100 countries. The steel capacity of the developing world rose from 10 million tons in 1960 to around 70 million tons (metric) in 1970. By 1990, it's expected the developing countries will have as much as 116 million tons of raw steel capability.

All of which is a source of great concern to steel people in the U.S. and the rest of the First World. With a

global surplus of 300 million tons, the smaller nations continue to build steel plants. Most of these plants are government owned and government backed. Many of these have more capacity than the home markets can absorb.

There are special reasons for concern today because capital and technology are highly mobile. There can be almost instant industrialization of low wage countries.

Until recently, the impact of this sudden transition was cushioned by unfavorable conditions in much of the developing world. Support facilities were deficient. More important, the low wages were offset by the low quality of the work force.

In tropical areas, people had lived for generations in a climate that discouraged strenuous exertion and made it possible to exist without too much exertion.

"All of a sudden you tell those people they should have an industry and work five days a week in such a foreign thing as a steel plant," said Eckart E. Goette, president of Midrex Corp. There is a culture shock that can only be overcome in time with education and good leadership, said Mr. Goette whose company brought direct reduction to Iran, Qatar and other unlikely places.

The problems of steel plants in Nigeria and other countries were noted by W. J. Bottomley, who helped build and operate the new Saudi Arabian steel mill before becoming executive vice president and general manager of Lectromelt Corp.

"They are just too bloody big for the local infrastructure," said Mr. Bottomley of the lagging operations. "The local capabilities are two generations away from what is involved in steel operations."

In other words, you can't simply plug in a new steel plant and watch the stuff roll out. It still takes competence and sweat to make steel. These ingredients, which have been missing in many past programs, are abundantly available in countries now building steel plants.

"One of the things the South Koreans have is a tremendous amount of self discipline," said Mr. Goette.

"I think we will see a similar kind of thing in China," said Mr. Bottomley.

Others report a good work ethic in the Philippines. "They have the potential of being another South Korea," said Ralph M. Smailer, manager of electric arc furnaces, Davy McKee Equipment Corp.

Mr. Bottomley had occasion to test this view when he was running the electric furnace shop at Al Jubail in Saudi Arabia. "I had both Indian and Filipino workers operating the furnaces," he said. "They could hold up their heads with anyone. They only had to be shown how and given some explanations and by golly, they were picking it up pretty damn good."

As this suggests, there are now a lot of places where there are good workers to go with the modern machines. If they think things are tough today, mill officials can consider a future in which steel may be made by one billion clever, hard working Chinese. The potential is there because there is no problem getting the money for machinery. The established countries are falling all over themselves trying to offer the most liberal financing of equipment.

South Korea

For South Korea's big steel expansion at Gwangyang, Voest-Alpine offered financing at 6.25 pct. Mannesman-Demag offered less than 7 pct for the Korean continuous caster. Davy McKee of Great Britain had a rate of 6 pct on the blast furnace.

Capital is available and the physical construction of a modern steel complex is possible in the most remote corners of the earth. Now operating on an island near Borneo is a Malaysian Midrex plant capable of producing 650,000 tons of briquetted iron a year.

"We have been able to build these rapidly," said Mr. Goette of Midrex. "It's possible to build a direct reduction plant in $2^1/_2$ years. We have been able to do that."

South Korea is probably the prime example of what happens when you combine efficient operations with primitive wages. One obvious effect is low cost steel; Korea has been able to invade even the Japanese market.

The second effect is surplus steel. By 1982, South Korea had a 6-million-ton surplus available for export. When people ride bicycles to work and operate Cadillac equipment, they will tend to produce more than they consume.

Without efficiency on the other hand, a country can have low wages and still consume more than it produces. That is still the situation of the developing countries as a whole. According to the International Iron & Steel Institute (IISI), The Third World will consume 110 million tons in 1985 and be able to produce no more than 70 million tons.

IISI looked for consumption of the developing countries to rise to 122 million tons by 1990. The gap between supply and demand will narrow, but consumption will still be greater—by 6 million tons.

Trinidad's steel program illustrates why there is a Third World steel deficit. That country's ISCOTT plant was started in 1981 with 500,000 tons of the most modern capacity. According to recent reports, production has been running about 10,000 tons a month and big losses have been piling up. Laclede Steel Co. and Bechtel have been invited in to straighten things out.

"They just did not know what maintenance was all about," said Pierre Gosselin, who headed operations at ISCOTT until a year and a half ago.

"When we started the equipment, everything was new and worked rather nicely," continued Mr. Gosselin, who is now production vice president for Sidbec-Dosco Inc. "But as time passed, the equipment got damaged. We pushed for repairs but we got to the point where it was almost useless."

Things might have been different, Mr. Gosselin said, had the original Trinidad prime minister remained in power. The new man "started a campaign to get all foreigners out of the country.... They weren't even listening to us."

Direct Reduction Plants Producing Steelmaking-Grade DRI

Installed or Under Construction as of June 1, 1985

Start-Up	Company	City	Country	Process	Units	Fuel	Capacity
1957	Hylsa	Monterrey	Mexico	HyL	1	Gas	95
1967	Tamsa	Vera Cruz	Mexico	HyL	1	Gas	235
1969	Hylsa	Puebla	Mexico	HyL	1	Gas	315
1970	NZS	Glenbrook	New Zealand	SL/RN	1	Coal	185
1971	HSW	Hamburg	W. Germany	Midrex	1	Gas	400
1971	GSC	Georgetown, SC	USA	Midrex	1	Gas	400
1973	Piratini	Charquedos	Brazil	SL/RN	1	Coal	65
1973	Dunswart	Benoni	S. Africa	Codir	1	Coal	150
1973	Sidbec	Contrecoeur	Canada	Midrex	1	Gas	400
1974	Usiba	Bahia	Brazil	HyL	1	Gas	250
1976	Sidor	Matanzas	Venezuela	HyL	1	Gas	360
1976	Siderca	Campana	Argentina	Midrex	1	Gas	330*
1976	Fior	Matanzas	Venezuela	Fior	1	Gas	400
1977	NISCO	Ahwaz	Iran	Purofer	1	Gas	330
1977	Sibec	Contrecoeur	Canada	Midrex	1	Gas	600
1977	Hylsa	Puebla	Mexico	HyL	1	Gas	630
1977	Sidor	Matanzas	Venezuela	Midrex	1	Gas	355
1978	Krakatau	Kota Baja	Indonesia	HyL	1	Gas	575
1978	Acindar	Villa Const.	Argentina	Midrex	1	Gas	600
1978	Qasco	Umm Said	Qatar	Midrex	1	Gas	400
1979	BSC	Hunterston	UK	Midrex	2	Gas	800*
1979	Hylsa	Monterrey	Mexico	HyL III	1	Gas	250*
1979	Soidac	Khor Al-Zubair	Iraq	HyL	2	Gas	485*
1979	Sidor	Matanzas	Venezuela	Midrex	3	Gas	1275
1980	SIIL	Paloncha	India	SL/RN	1	Coal	30
1980	Siderperu	Chimbote	Peru	SL/RN	3	Coal	100
1980	Krakatau	Kota Baja	Indonesia	HyL	1	Gas	575
1980	ISCOTT	Point Lisas	Trinidad	Midrex	1	Gas	420
1980	Sidor	Matanzas	Venezuela	HyL	2	Gas	1408
1981	Mining Corp.	Maymyo	Burma	K-M	1	Coal	20
1981	Nordferro	Emden	W. Germany	Midrex	2	Gas	880*
1981	Sidor	Matanzas	Venezuela	HyL	1	Gas	704
1982	Hadeed	Al Jubail	Saudi Arabia	Midrex	1	Gas	400
1982	Krakatau	Kota Baja	Indonesia	HyL	2	Gas	1150
1982	DSC	Warri	Nigeria	Midrex	2	Gas	1020
1982	ISCOTT	Point Lisas	Trinidad	Midrex	1	Gas	420
1983	OMEK	Kursk	USSR	Midrex	1	Gas	417
1983	Scaw Metals	Germiston	S. Africa	DRC	1	Coal	75
1983	Hadeed	Al Jubail	Saudi Arabia	Midrex	1	Gas	400
1983	Hylsa	Monterrey	Mexico	HyL III	1	Gas	500
1983	OSIL	Keonjhar	India	Accar	1	Coal	150
1984	SGI	Lubuan Island	Malaysia	Midrex	1	Gas	650
1984	ISCOR	Vanderbijilpark	S. Africa	SL/RN	4	Coal	600
1984	Mining Corp.	Maymyo	Burma	K-M	1	Coal	20
1984	SIIL	Paloncha	India	SL/RN	1	Coal	30
1985	Sicartsa	Las Truchas	Mexico	HyL III	2	Gas	1000
1985	Perwaja	Chukai	Malaysia	NSC	1	Gas	600
1985	Daysteel	Vanderbijilpark	S. Africa	Rot. Kiln	1	Coal	30
1985	NISCO	Ahwaz	Iran	Midrex	3	Gas	1200
1985	I&S Complex	Misurata	Libya	Midrex	2	Gas	1100
1985	OEMK	Kursk	USSR	Midrex	1	Gas	417
1985	USCO	Vereeniging	S. Africa	Plasma	1	Coal Gas	250
1986	Sicartsa	Las Truchas	Mexico	HyL III	2	Gas	1000
1986	Ipitata	Joda	India	Tisco	1	Coal	90
1986	OEMK	Kursk	USSR	Midrex	1	Gas	417
1986	NISCO	Ahwaz	Iran	HyL	3	Gas	1000
1987	Soidac	Khor Al-Zubair	Iraq	HyL	2	Gas	1000
1987	NISCO	Mobarakeh	Iran	Midrex	2	Gas	1280
1987	ANSDK	El Dikheila	Egypt	Midrex	1	Gas	716
1987	OEMK	Kursk	USSR	Midrex	1	Gas	417
1988	NISCO	Mobarakeh	Iran	Midrex	3	Gas	1920

*Not Operating

Trinidad might not be typical of the developing world but it isn't unique either. Another notable failure took place at a new steel plant in Nigeria.

"They didn't have the power to make steel once they were ready to go," said Mr. Bottomley.

When the plant did get going, it ran into bureaucratic supply problems. "They find they need some spare parts," said Mr. Goette. "These spare parts are held up in airports because of customs regulations."

The Russians have been involved in a Nigerian blast furnace plant. "They've been working on it for years and years," said an engineer. "I don't think that plant has ever been successfully operated."

"That situation has changed quite a bit," said Mr. Smailer of Davy McKee. "The work force is quite high quality." The region now has a surplus of qualified labor, he said.

The big SIDOR complex in Venezuela has had problems. There were also problems initially at the FIOR direct reduction plant located in the same region of Venezuela.

Mr. Goette insisted the Midrex plants have performed well in all cases. "The direct reduction process, itself, is very easy to manage," he said. "In all the countries where we've built direct reduction plants as part of steel operations, the problem has never been the direct reduction plant.

"The problem is the steelmaking," he continued. "You need a lot of experience and you need to react very quickly to unexpected situations."

The Midrex plant in Malaysia is the first of this type to be operated strictly on a merchant basis. Hot briquetted iron from the plant is being shipped to Turkey, Spain, and other places.

"They have some U. S. expatriates managing the plant," said Mr. Goette. "They involve the local people. The board consists of Malaysian people—well educated."

Saudi Arabia

In Saudi Arabia, the big Al Jubail plant has had a good start. "I would have to say ours was a success," said Mr. Bottomley.

Al Jubail has two Midrex series 400 reduction plants, three 6.8-meter, 70-mva furnaces, and three six-strand continuous casters. Construction products are rolled on a rod mill and a bar mill.

A complete infrastructure, including port facilities, was available. Not available in the area were management or hourly people.

"We utilized supervision from industrial countries," said Mr. Bottomley. "We relied on a labor force primarily from India and to a lesser degree, from the Philippines."

With out-of-town personnel, he noted, there are costs that don't occur in developing countries. "When you import people," he said, "you have to look after their housing, their food, their clothing, plus providing transportation to and from their home once a year. So they aren't cheap even though they might not take much money home in their pockets."

Saudi Arabia hopes to use local people eventually, but the plant will probably have to rely on outside managers for some time. Getting Westerners to stay in Saudia Arabia could become a problem because the country is moving away from the comfortable enclaves that used to be provided by the oil companies for their people.

It's now more necessary to conform to the conservative customs of the area. "The conditions can get the best of a lot of people ," said Mr. Bottomley.

More serious, he indicated, were problems created by the political structure. "It was a little difficult running what I call a scaled-up minimill and trying to work with the local bureaucratic methods," he said. "A steel mill is a great consumer and if you try to use bureaucratic procedures for purchasing, it does try one a bit."

Trying conditions have had an important effect in Nigeria. "They have had to import steel because the plant is not reaching its capacity," said Mr. Goette.

As IISI has reported, this is representative of the whole Third World situation. Like airline safety statistics, the steel deficit numbers offer only limited comfort to mills being buffeted by tonnage from developing countries. Individual developing countries have surpluses that are exported.

Deficits vs Surpluses

South Korea, Brazil, Taiwan, Romania, and Argentina are among the countries that have swung from steel deficits to surpluses in recent years. Mexico, with an overall deficit, still shipped nearly 800,000 tons to the U. S. in 1984.

There is surplus capacity and most of the developing nations are under heavy pressure to export. "Recent estimates put the external debt of developing countries at $608 billion in 1984, rising to $645 billion in 1985," said Lenhard J. Holschuh, secretary general of IISI. "The Third World's debt service payments will absorb one-third of its export earnings next year (1985)."

Two months ago, IISI boosted its debt estimate to nearly a trillion dollars in 1985. Brazil and Mexico both owe more than $80 billion. The foreign debt of Brazil's steel holding company was over $7 billion in 1983.

These massive obligations tend to force steel on the world market and they give the exporters a free trade constituency among U. S. lenders. The political clout of the lenders was remarked on by David M. Roderick, chairman of U. S. Steel.

When it looked as though the developing nations would default on their loans, said Mr. Roderick, "the cooperation out of Washington was astounding and rapid."

There have been various studies and papers on the steel programs of developing nations. IISI recently updated its capacity and consumption numbers. Financial subsidies were documented in a study supervised by Thomas Howell, who was then with the Washington law firm of Verner, Liipfert, Bernhard and McPhereson. The study was sponsored by U. S. Steel and Bethlehem Steel.

Steel production in Eastern Eu-

rope was covered in a paper by Joel Dirlam, professor emeritus, University of Rhode Island.

From these and other sources, it's clear there has been a high degree of government involvement in the developing world and that results have varied widely.

Brazil

Brazil's raw steel output rose from 7.1 million tons in 1973 to 15.3 million tons in 1980. Capacity reached 20 million tons in 1982.

Sixty-five percent of Brazil's steel capacity is owned by the state. A state holding company called SIDERBRAS, controls nine steel operations, including the three big integrated mills: CSN, COSIPA, and USIMINAS. At one point the government was planning an expansion to 34 million tons by 1988. Three new integrated mills were to be built.

The big expansion was never completed but with its own economy depressed, Brazil found itself in the 1980s with surplus steel capacity and a foreign debt of more than $80 billion.

Steel exports to the U. S. were increased from 540,000 tons in 1981 to 1.1 million tons in 1984. U.S. Commerce Dept. found dumping margins of 100 pct on hot-rolled sheet from COSIPA and 89 pct on plate from the same company.

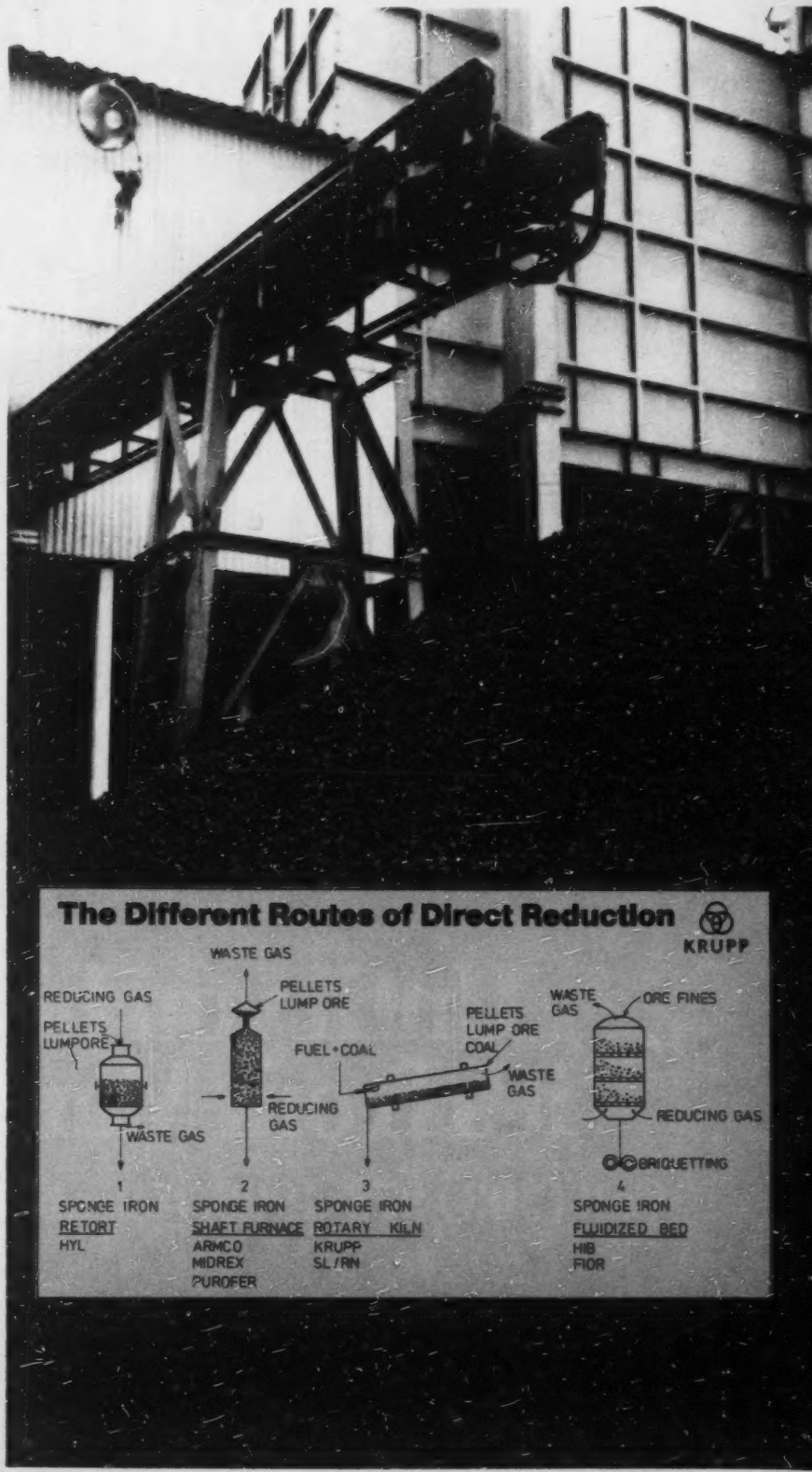
South Korea

The Pohang Iron & Steel Co., Ltd., was formed in 1968 with the Korean government having a controlling interest. Using war reparation funds from Japan, the government built the initial Pohang facilities. These could produce 1 million tons a year by 1973.

Successive expansions boosted Pohang's capacity to 9.1 million tons by 1983. The government was able to make low interest money available at home and provided backing for bargain financing abroad.

Under way now is the construction of a greenfield plant at Gwangyang. This could raise Pohang's capacity by 6 million tons.

South Korea began exporting in 1979 and by 1982 was shipping



nearly 6 million tons to other countries. Low wages, efficient production and aggressive pricing have enabled South Korea to penetrate major world markets including Japan's. In 1984, South Korea shipped 2.2 million tons to the U.S.

Spain

In 1982, Spain exported 5.1 million tons of steel.

The country was the world's eighth largest steel exporter, topping Brazil and Canada by goodly margins. In recent years, Spain's shipments to the U. S. have been the third largest of any developing country.

The trade volume has reflected a rise in Spanish capacity from about 3 million tons in 1964 to 16 million tons in 1982. With the domestic economy lagging, only 8 million tons were consumed at home in 1982.

Efforts to bring capacity into line with demand have met with strong popular resistance. A proposal to shut down a blast furnace operation at Sagunto brought street demonstrations by 35,000. The shutdown order was rescinded.

Spain's exports to the Common Market were limited to 900,000 tons a year by a bilateral agreement in 1978.

Taiwan

Taiwan can produce 7 million tons of steel a year. China Steel Corp., which is government owned, is the country's leading producer.

China Steel Corp. was formed in 1971, and plans called for facilities to produce 1.1 million tons by 1975. Construction was handled initially by Voest-Alpine and later by U. S. Steel.

By 1977, the first phase of China Steel had been completed at a cost just under $1 billion. In 1978, an expansion aimed at boosting capacity to more than 3 million tons was launched. Subsequent programs were scheduled to boost China Steel's capacity to 5.65 million tons and then to 11 million tons by 1991.

The recession of 1982 left Taiwan with more steel capacity than consumption. Exports were increased. With modern equipment and a dedicated work force, Taiwan has been able to sell its steel in Japan among other places.

Mexico

Mexico increased its capacity from 5.2 million tons in 1972 to 11.4 million tons in 1983. At the height of the oil boom, the country was shooting for a capacity of 20 million tons.

There is still that target, but activity has simmered down. More than half the steel capacity is held by three state-owned mills: AHMSA; Fundidora; and SICARTSA.

The privately owned HYLSA has 1.9 million tons of capacity and has pioneered the HYL direct reduction process. This is used by HYLSA and is in the current $3.35-billion expansion program of SICARTSA.

Mexico's situation helps explain how you can have a steel deficit in the Developing World and still have significant exports from the developing countries. Mexico is a net importer of steel but the country shipped nearly 800,000 tons of steel to the U. S. in 1984.

Venezuela

In 1974, Venezuela set out to increase its steel capacity from 1.5 million tons to 15 million tons by 1990.

A major element in this effort was to be an increase in SIDOR's capacity from 1 million tons to 4.8 million tons a year by 1979. In addition, a new greenfield mill was to be built in the ZULIA region.

SIDOR, which made extensive use of direct reduction, has had staggering losses—$500 million in 1981. There have been all kinds of production problems, but depressed conditions have reduced the domestic demand below supply.

One result is that SIDOR's exports increased more than 300 pct in 1983 to 785,000 tons. Of that total, nearly 500,000 tons were shipped to the U. S. in 1984.

Eastern Europe

The U. S. received nearly 700,000 tons of steel in 1984 from three Eastern Europe countries: Romania, Poland, and East Germany.

Relatively small quantities of steel came from Hungary, Yugoslavia, and Czechoslovakia. The total intake from the Eastern bloc was a little over 800,000 tons in 1984.

The Communist countries of Europe are closely tied to Russia in their steel operations. Iron ore, coke, and in some cases, semifinished steel come from Russia. Like that country, the Eastern nations have tended to lag in some phases of steelmaking. They have been slow in converting to continuous casting and oxygen steelmaking.

Although they probably don't make enough steel to really meet internal needs, the Eastern countries have become net exporters. Shipments to the Common Market are limited by bilateral agreements. Czechoslovakia has signed a voluntary agreement with the U. S.

In 1983, East Germany produced 35.7 million metric tons of raw steel. That was the highest in the East except for Russia. Other big producers were Poland with 16 million tons, Czechoslovakia with 15 million tons, and Romania with 13 million tons.

Exports to the U. S. have been erratic, spurting and subsiding periodically.

Voluntary Restraints

As of late May, major developing nations were among those that had signed steel import agreements with the U. S.

Brazil, Australia, Czechoslovakia, Finland, Mexico, South Africa, South Korea, and Spain had all agreed to limit steel shipments to the U. S.

The developed world was covered by an existing agreement with the Common Market and a new agreement with Japan.

Not covered by agreements were 42 of the 59 countries which shipped steel to the U. S. in 1984. "Imports from certain new suppliers have increased significantly," said President Reagan in May.

Mr. Reagan reaffirmed his pledge to limit imports of finished steel to 18.5 pct of U. S. supply. There could be problems but it appeared the developing nations were falling in line. In the first quarter of 1985, imports from these countries were down 6 pct from 1984. □

NOTE

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